* NOTICES *

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CLAIMS

[Utility model registration claim]
[Claim 1] **) An output shaft and an input shaft are considered as the arrangement each center line of whose corresponds, and body of revolution-ed is prepared in the toe of an output shaft. At least two lock object acceptance sections which become this body of revolution-ed from the lock object push wall formed in the direction of a radius line of **** body of revolution and lock ****** are prepared in the location before and behind a hand of cut. The lock object which makes the shape of a rod to radial is installed in said lock object acceptance section in the condition loose to radial between said lock ****** and inner skin of the after-mentioned casing. A rotation disk is prepared in the toe of an input shaft, and the heights for rotation transfer which contact the point of said lock object protrude on the periphery part of this rotation disk. Said body of revolution-ed and rotation disk, and a lock object are assembled within casing of a cylindrical shape, and rotation of said casing is stopped, RO Said lock object is formed somewhat longer than the die length on the radius line from lock ****** of said lock object acceptance section to the inner skin of said casing, Ha Said lock object push wall is formed somewhat more sharply than the radius line passing through the core of body of revolution-ed, NI It is a pivotable rotation transport unit by the input shaft about the output shaft characterized by establishing the delivery means which tells the turning effort from a lock object to body of revolution-ed between two lock objects contained by said two lock object acceptance sections, respectively.
[Claim 2] It is a pivotable rotation transport unit by the input shaft about the output shaft which is characterized by preparing the spring which has the resiliency which can hold the condition that each outer edge of two lock objects contained by the two lock object acceptance sections which adjoin a hand of cut contacted the inner skin of casing between said two lock objects and which was indicated to claim 1.
[Claim 3] A spring is a pivotable rotation transport unit by the input shaft about the output shaft which is characterized by being formed in the curve configuration which has the curl section in the both ends, and is roundish as a whole and which was indicated to claim 2.
[Claim 4] It is a pivotable rotation transport unit by the input shaft about the output shaft which a notch is formed in the outer-diameter side of body of revolution-ed, and the projection which fits into the notch circles concerned protrudes on the rotation disk, and is characterized by being the configuration that said projection transmits turning effort to body of revolution-ed in contact with the edge of a notch by rotation of an input shaft and which was indicated to claim 1 or 2.
[Claim 5] A lock object is a pivotable rotation transport unit by the input shaft about the output shaft which is characterized by being formed by phosphor bronze or brass and which was indicated to claim 1 or 2.

[Translation done.]

DETAILED DESCRIPTION

[Detailed explanation of a design]
[0001]
[Industrial Application]
the means which carries out the rotation drive of the sheet roller of the covering sheet switchgear which this design involves the covering sheet of a vinyl house in a sheet roller, and is opened and closed — carrying out — or said sheet roller — the same — an output shaft — a load etc. — forward — reverse — the output shaft widely used for an application which is troubled if it rotates in any direction is related with a pivotable rotation transport unit with an input shaft.
[0002]
[Description of the Prior Art]
Conventionally, a pivotable rotation transport unit is indicated by previous JP,1-266359,A only with an input shaft in the output shaft used for the sheet switchgear of a vinyl house etc., and it is well-known. As this rotation transport unit was shown in drawing 13 and drawing 14 , the output shaft 2 and the input shaft 1 were considered as the arrangement each center line of whose corresponds, and provide the body of revolution 3-ed in the axis end section of an output shaft 2. Lock object push wall 4b is formed in the direction of a radius line of the **** body of revolution 3, lock ******* 4a which has a moderate wedge include angle in a tangential direction is formed in the peripheral face section of the body of revolution 3-ed, and at least two lock object acceptance sections 4 by both are formed in it. The heights acceptance section 10 which dedicates the after-mentioned heights 6 for rotation transfer so that two lock ******* 4a in this lock object acceptance section 4 may be made to continue is formed in the circumferencial direction. The deepest part of lock ******* 4a and the roller 5 of approximately the same diameter are installed in said lock object acceptance section 4 as a lock object. The rotation disk 9 is formed in the axis end section of an input shaft 1. The heights 6 for rotation transfer located in the heights acceptance section 10 of said body of revolution 3-ed protrude on this rotation disk 9, and it considers as the relation which contacts the roller 5 located in the lock object acceptance section 4 of those both sides. Said body of revolution 3-ed and rotation disk 9 are in the outer diameter of the body of revolution 3-ed, abbreviation, etc. by carrying out, are compared within cylinder object 8' (casing) of a bore, make the heights 6 for rotation transfer advance to the heights acceptance section 10 of the body of revolution 3-ed, and are assembled. Rotation of said cylinder object 8' is stopped.
[0003]
this rotation transport unit — an output shaft 2 — forward — reverse — if it is going to rotate in the direction of either, the roller 5 as a lock object will eat away like a wedge between lock ******* 4a of the lock object acceptance section 4 and the inner skin of cylinder object 8' which have a wedge include angle in a tangential direction, will be controlled by frictional force, and will serve as rotation impossible. however, the input shaft 1 — forward — reverse — if it rotates in the direction of either, lock object push wall 4b by the side of the hand-of-cut front of the heights 6 for rotation transfer of an input shaft 1 pushes a roller 5, and locates a roller 5 in the looseness field in the lock object acceptance section 4. Moreover, the roller 5 by the side of method Kogo of rotation of the heights 6 for rotation transfer is pushed to lock object push wall 4b of the body of revolution 3-ed, and is too located in the looseness field in the lock object acceptance section 4. Therefore, an input shaft 1 rotates freely due to output shafts 2 and 1:1.
[0004]
[The technical problem which this design tends to solve]
Since rotation of an output shaft 2 is the configuration that rotation is controlled in the actuation into which a roller 5 eats like a wedge to between lock ******* 4a of the lock object acceptance section 4, and the inner skin of cylinder object 8' in the case of above-mentioned drawing 13 and the rotation transport unit of drawing 14 , the inner skin of a roller 5 and the inner skin of cylinder object 8' get damaged shakily, and stop operating smoothly by long repetition use. Moreover, if the body of revolution 3-ed of an output shaft 2 and the rotation disk 9 of an input shaft 1 are especially fabricated as an aluminum die-casting article or a cast in order to raise the productivity of this rotation transport unit and to lower manufacture cost, the draft will surely occur. On the other hand, since the roller 5 as a lock object is begun and cylinder object 8' is respectively considered as the configuration comparatively long in the direction of an axis at the heights 6 list for rotation transfer of lock object push wall 4b, lock ******* 4a, or an input shaft in the body of revolution 3-ed of an output shaft 2 The aforementioned draft serves as the phenomenon in which push wall 6a of the heights 6 for rotation transfer in the inclination and the rotation disk 9 of the direction of an axis of lock object push wall 4b inclines in the direction of an axis in the body of revolution 3-ed of an output shaft 2. Consequently, when an input shaft 1 rotates towards one of right reverse (n or the direction of m of an arrow head shown in drawing 14), it inclines in the direction of an axis to a roller 5, and it will be in a condition per piece, and the heights 6 for rotation transfer do not push this roller 5 on the axis and parallel, but incline it to them a little. For this reason, rotation of an output shaft 2 is carried out grumblingly too, and it has the problem that it does not rotate smoothly and let it be the technical problem which should be solved.
[0005]
Therefore, even if it uses the purpose of this design smoothly [of rotation], and for a long period of time, it is to offer the rotation transport unit by which the dependability on the engine performance is held.
[0006]
[Means for Solving the Problem]
As a means for [of the above-mentioned conventional technique] carrying out The means for solving a technical problem

solution, the rotation transport unit concerning this design I An output shaft 22 and an input shaft 21 are considered as the arrangement each center line of whose corresponds. Have formed the body of revolution 23-ed in the toe of an output shaft 22, and at least two lock object acceptance sections 24 which become this body of revolution 23-ed from lock object push wall 23a and lock ******23b which were formed in the direction of a radius line of the **** body of revolution 23 are formed. It is installing in a condition with the lock object 25 loose to radial between lock ****** 23b and the inner skin of the after-mentioned casing 28 which makes the shape of a rod to radial at said lock object acceptance section 24. The rotation disk 29 is formed in the toe of an input shaft 21, and the heights 26 for rotation transfer which contact the point of said lock object 25 protrude on the periphery part of this rotation disk 29. Said body of revolution 23-ed and rotation disk 29, and the lock object 25 are having been assembled within the casing 28 of a cylindrical shape and having stopped rotation of this casing 28. RO Said lock object 25 It forms somewhat longer than the die length on the radius line from lock ******23b of said lock object acceptance section 24 to the inner skin of said casing 28 Ha Said lock object push wall 23a It forms somewhat more sharply than radius line P-Q passing through the core of the body of revolution 23-ed, NI It is characterized by preparing feed plate 30 grade as a delivery means which tells the turning effort from the lock object 25 to body of revolution-ed between two lock objects 25 and 25 contained by said two lock object acceptance sections 24 and 24, respectively (drawing 1 , 2).

[0007]

Moreover, this design is characterized also by forming the spring 50 which has the resiliency which can hold the condition that each outer edge of two lock objects 25 and 25 contained as a means for preventing unprepared rotation of an output shaft certainly by the two lock object acceptance sections 24 and 24 which adjoin a hand of cut contacted inner skin 28a of casing 28 between said two lock objects 25 and 25 (drawing 7 , 8). This spring 50 is characterized also by forming in the curve configuration which has curl section 50a in those both ends, and is roundish as a whole (drawing 10).

[0008]

In addition, this design forms 23d of notches in the outer-diameter side of the body of revolution 23-ed as a premise which adopts the aforementioned spring 50, and protrudes on the rotation disk 29 projection 29a which fits in in the 23d of the notches concerned, and it is characterized also by being the configuration of transmitting turning effort to the body of revolution 23-ed by rotation of an input shaft 21 in contact with the edge said whose projection 29a is 23d of said notches.

[0009]

Furthermore, said lock object 25 is characterized also by forming by metaled phosphor bronze or brass.

[0010]

[Function]

an output shaft 22 — forward — reverse — if it is going to rotate in the direction of either, lock object push wall 23a by the side of before [in the body of revolution 23-ed] a hand of cut the lock object 25 which makes the shape of a rod to radial [which is located in the lock object acceptance section 24 of the front] Push and the lock object 25 make radial stretch the long lock object 25, with a contact with the inner skin of casing 28 fixed, produce the force pushed on the method of outside, and generate and control frictional force so that one end within radial of the tilt angle of said lock object push wall 23a, therefore the lock object 25 may be preceded. Therefore, since rotation of casing 28 is stopped, rotation of the body of revolution 3-ed and an output shaft 2 serves as impossible.

[0011]

Moreover, since the condition that, as for the two lock objects 25 and 25 which adjoin a hand of cut, the outer edge contacted always lightly to casing inner skin 28a with the spring 50 is held, if turning effort works to an output shaft 22, the lock object 25 will be stretched [as opposed to / immediately / inner skin of casing 28 28a], big frictional force is demonstrated, the skid on inner skin 28a is prevented completely, and unprepared rotation of an output shaft 22 can be prevented certainly.

[0012]

on the contrary, the input shaft 21 — forward — reverse — when rotating in the direction of either, it is made to incline so that the radial outside edge of the lock object 25 with which the heights 26 for rotation transfer of the rotation disk 29 carry out advance rotation, and are located in the lock object acceptance section 24 of the front may be pushed and it may fall positively Therefore, the lock object 25 goes to the front with the heights 26 for rotation transfer, without being stubborn between inner skin 28a of casing 28. The lock object 25 located from the heights 26 for rotation transfer in the lock object acceptance section 24 by the side of back at this time advances by being followed on the feed plate 30 which inclines so that it may become the form left by rotation of the body of revolution 23-ed and may fall backward, and is behind for a while, and rotation of an input shaft 21 and the heights 6 for rotation transfer is transmitted to the body of revolution 23-ed and an output shaft 2.

[0013]

Even if the spring 50 is installed between two lock objects 25 and 25 which adjoin a hand of cut There is no trouble in the heights 26 for rotation transfer pushing and moving the radial outside edge of the front lock object 25. Projection 29a prepared in the rotation disk 29 contacts to the edge of 23d of notches formed in the body of revolution 23-ed as well as the frictional force of the outer edge of the lock object 25 stretched between casing inner skin 28a being canceled easily. Turning effort of an input shaft 21 can be smoothly rotated by being certainly transmitted to an output shaft 22.

[0014]

[Example]

Next, the example of illustrated this design is explained.

In the rotation transport unit shown in drawing 1 and drawing 2 , 21 in a sign Fig. is an input shaft, and 22 is an output shaft. Opposite arrangement of an input shaft 21 and the output shaft 22 is carried out at a single string so that each center line may be in agreement (drawing 2).

[0015]

the width of face of the lock object 25 of a postscript [section / of an output shaft 22 / axis end / shape / of a basic form], and abbreviation — the body of revolution 23-ed which formed the lock object acceptance section 24 as a radial notch configuration is formed in one by the shape of same disk type of thickness. The three lock object acceptance sections 24 (however, the number and arrangement should just be not this limitation but one or more pieces.) are formed in the location which divided 120 degrees of peripheries of the body of revolution 23-ed at a time into three equally. The lock object acceptance section 24 is formed as a notch which somewhat keen straight-line-like lock object push wall 23a which inclines, comes out and separates from said center of rotation P more specifically cut deeply deeply enough to radial at drawing 1 to radius line P-Q lengthened from the center of rotation P of an output shaft 22. Heights 23c of the shape of a small semicircle which restrains the inner end position of the lock object 25 is prepared in the center of pars-basilaris-ossis-occipitalis abbreviation of the dead

air space of the shape of a sector formed with two lock object push walls 23a and 23a which get mixed up in a hand of cut, and lock ****** 23b is formed in it between lock object push wall 23a of the both sides of this heights 23c.
The feed plate 30 as a means to transmit turning effort through the lock object 25 in the abbreviation center section of the lock object acceptance sections 24 and 24 of two phase next door **** is formed in the hand of cut. The feed plate 30 is formed between the lock objects 25 of both sides in the magnitude and the configuration which have a clearance between some in a hand of cut. It is also possible for the feed plate 30 to be considered as the configuration of another object in an output shaft 22 and the body of revolution 23-ed in consideration of the facilities of an assembly in the case of the example of drawing 1 and drawing 2 , but to form in not this limitation but the body of revolution 23-ed and one.
[0016]
One lock object 25 of the shape of a rod formed in said lock object acceptance section 24 with ingredients, such as brass which is a comparatively soft metal, or phosphor bronze, is installed at a time by arrangement with the play which can be tilted to a hand of cut (refer to drawing 1). The point of this lock object 25 is bent by the character of ** in order to secure the allowances of radius lay length for resiliency. The inner edge of the lock object 25 is contacted by lock ****** 23b, and the outer edge is flexibly contacted by inner skin 28a of the casing 28 of a cylindrical shape. In short, the lock object 25 is somewhat formed for a long time rather than the die length on the radius line from lock ******23b to inner skin 28a of casing 28.
[0017]
On the other hand, the bore of inner skin 28a of the casing 28 of said cylindrical shape and the rotation disk 29 which makes disc-like [of the same outer diameter] mostly are formed in the toe of an input shaft 21 in one. It is circumscribed to the outer-diameter side of said body of revolution 23-ed free [rotation], and the heights 26 for rotation transfer of the shape of a rib projected in the direction of an axis so that the outside edge of the lock objects 25 and 25 moreover located before and behind a hand of cut might be contacted protrude on the peripheral face section of this rotation disk 29. Opposite arrangement of this input shaft 21 and output shaft 22 is carried out at a single string so that the same center line may be shared, the rotation disk 29 and the body of revolution 23-ed are compared within the casing 28 of a cylindrical shape, and the heights 26 for rotation transfer and the body of revolution 3-ed of the rotation disk 29 are assembled. The direction die length of an axis of these heights 26 for rotation transfer is formed in the width of face and abbreviation identitas of the lock object 25 like the width of the above-mentioned lock object acceptance section 24. Side-face opening of casing 28 is sealed by the side cover 31. Let casing 28 and the boss sections 28b and 31a of a side cover 31 be the bearing of an output shaft 22 and an input shaft 21.
[0018]
Therefore, it is stopped so that it may not rotate with the fixed means with which casing 28 omitted illustration, and if it rotates in the direction of a clockwise rotation of drawing 1 , the heights 26 for rotation transfer of the rotation disk 29 move forward, in contact with the outside edge of the lock object 25 located in the front side, the outer edge of this lock object 25 will be pushed, and an input shaft 21 will be moved. At this time, since the lock object 25 is restrained by lock ****** 23b in the toe, it will be in the condition of inclining so that an outside edge may fall on a front side. Therefore, this lock object 25 does not serve as a rotational failure.
Moreover, the lock object 25 by the side of method Kogo of rotation inclines to the condition of falling on the method Kogo sense of rotation with rotation of the body of revolution 23-ed, as a result its lock ****** 23b by using a contact with inner skin 28a of casing 28 as the supporting point, and a rotational failure does not become too. The above actuation is completely similarly realized, when an input shaft 21 rotates in the direction of a counterclockwise rotation. Therefore, rotation of an input shaft 21 and the rotation disk 29 is performed freely, the heights 6 for rotation transfer push the lock object 25, push and the lock object 25 push a feed plate 30 the back, and the rotation tells rotation of the same rate in the same direction to the body of revolution 23-ed and an output shaft 22. Also when an input shaft 21 is rotated in the direction of a counterclockwise rotation of drawing 1 , rotation is told by the completely same principle of operation to an output shaft 22.
[0019]
When an output shaft 22 (therefore, body of revolution 23-ed) tends to rotate in an operation of a load or external force, on the other hand, lock object push wall 23a of the body of revolution 23-ed It is going to advance the toe of the lock object 25 located in a before [a hand of cut] side by the effectiveness of the keen include angle. The force of pushing this lock object 25 in the direction of an outside although the outer edge of this lock object 25 contacts to inner skin 28a of casing 28 and is being fixed to it therefore is produced. It is stubborn to inner skin 28a of casing 28 like the stock of skiing completely, frictional force is generated in it, and rotation of the body of revolution 23-ed is controlled to it, and it is made, as for the lock object 25, to become rotation impossible. this actuation -- an output shaft 22, as a result its body of revolution 23-ed -- forward -- reverse -- when carrying out rotation [which], it completely realizes similarly.
[0020]
In short, the output shaft 22 is absolutely impossible for rotating with external force, a load, etc. in forward reverse both directions, and can make forward reverse both directions rotate this output shaft 22 freely only with an input shaft 21 above. Therefore, this rotation transport unit can be used suitable for an application which is troubled if an output shaft 22 rotates freely with a load etc., or an application [need / the rotation location of an output shaft 22 / certain / to be positioned].
[0021]
[The 2nd example]
Each feed plate 30 is fabricated by cylinder part 30a and one, the rotation transport unit shown in drawing 3 and drawing 4 inserts an output shaft 22 in this cylinder part pivotable, and the assembly of a feed plate 30 and the body of revolution 23-ed is performed, And projection 33 is formed in the center of abbreviation of the outer-diameter side of the body of revolution 30-ed, this is inserted in into long slot 26a formed in the hand of cut somewhat long at the heights 26 for rotation transfer, and it is characterized by enabling transfer of turning effort by contact on projection 33 and the edge of long slot 26a, respectively. Other configurations are completely the same as the thing of the 1st example.
[0022]
[The 3rd example]
The rotation transport unit shown in drawing 5 and drawing 6 prepares the moderation device by the epicyclic gear in an input shaft 21, and is characterized by the point constituted so that big torque might be demonstrated and it could be lightly operated in a light input. A sun gear 41 is formed in the edge of an input shaft 21, and three epicyclic gears 42 which mesh with this are meshed with the internal gear 43 of a periphery. The internal gear 43 is being fixed to the inner circumference of casing 8. The cantilevered suspension of the shaft of an epicyclic gear 42 is carried out to the rotation disk 29, and the rotation disk 29 performs rotation by which only the number-of-teeth reciprocal ratio was slowed down to the rotational speed of an input shaft

21 (the thing of the example of illustration is slowed down to 1/4), and is transmitted as rotation to an output shaft 22 by the principle of operation as the 1st and 2nd examples with the same it. Therefore, an output shaft 22 can be rotated with 4 times as much torque as the torque conversely added to the input shaft 21, and it is effective when a load is large.

[0023]

[The 4th example]

the point of having made the condition that the rotation transport unit shown in drawing 7 and drawing 8 removed the feed plate 30 of the 1st example, formed the flat spring 50 of the trapezoidal shape which has fixed strength in the location, and the outer edge of the lock object 25 contacted to casing inner skin 28a hold — the description — carrying out — others — the 1st example and abbreviation — it is the same configuration. Said flat spring 50 is formed in the hand of cut at the heights 23c side along between two lock objects 25 and 25 contained by the lock object acceptance sections 24 and 24 of two phase next door ****. The flat spring 50 of this trapezoidal shape can also be prepared in the form where are between two lock objects 25 and 25, and the inner skin 28a side of casing 28 is met, as shown in drawing 9 . In this case, there is an advantage which can be installed also in the rotation transport unit which has a feed plate 30 like said 1st example. If the flat spring 50 concerned has the resiliency of extent which can hold the condition that each outer edge of the lock object 25 contacted inner skin 28a of casing 28, it is sufficient for it. According to this example, even if, as for the lock object 25, external force, vibration, etc. are added according to a spring operation of a flat spring 50 at the time of stopping rotation of an input shaft since the condition that the outer edge always contacted casing inner skin 28a was held, and an output shaft, the lock object 25 never considers an unnecessary motion as a rattle. And since the outer edge of the lock object 25 is certainly stretched to inner skin 28a of casing 28 to rotation of an output shaft 22 (body of revolution 23-ed) and demonstrates big frictional force, it does not have a possibility that an output shaft 22 may rotate carelessly.

[0024]

on the other hand — an input shaft 21 — forward — reverse — when rotating in the direction of either, too, the heights 26 for rotation transfer push and move the outside edge of the front lock object 25, and cancel the outer edge of the lock object 25 of a contact condition with inner skin 28a of casing 28. Therefore, the rotation of the lock object 25 which goes to the front freely with the heights 26 for rotation transfer is attained, without being stubborn between casing inner skin 28a. In addition, if it is used from the core of the body of revolution 23-ed, putting the presser-foot implement 51 of a battledore configuration of magnitude which gets into the dead air space inside said flat spring 50, a spring 50 can be restrained from the upper part and the stability on structure can be raised.

[0025]

Next, 23d of notches is formed in the abbreviation mid gear of the outer-diameter side of the body of revolution 23-ed as a means which tells the turning effort of an input shaft 21 to the body of revolution 23-ed instead of the feed plate 30 of the 1st example. On the other hand, projection 29a which fits in in 23d of said notches protrudes on the inside abbreviation mid gear of the heights 26 for rotation transfer of the rotation disk 29. This projection 29 is formed in the arrangement which contacts the edge whose projection 29a concerned is 23d of notches [after the heights 26 for rotation transfer preceding the heel of the front lock object 25 by rotation of an input shaft 21 and pushing and moving]. therefore, projection 29 transmits the turning effort of the rotation disk 29 to the body of revolution 23-ed and an output shaft 22 certainly in contact with a notch 23 — having — forward — reverse — any rotation can be performed freely. 41 in drawing is the sun gear formed in the edge of an input shaft 21, the epicyclic gear 42 which meshes with this is meshed with the internal gear 43 of a periphery, and the epicyclic gear-type reduction gear is constituted. This is the means of mitigation-izing of an actuation input of an input shaft 21 like said 3rd example.

[0026]

[The 5th example]

The rotation transport unit shown in drawing 10 is the example which used the thing of the letter of a curve as a configuration of the flat spring 50 of said 4th example, and other configurations are the same as that of the 4th example.

The both ends of a flat spring 50 are bent for a while inside, are formed in the curl sections 50a and 50a, and are formed in the curve roundish [wore on the whole]. The flat spring 50 of the curve configuration concerned is inserted in and formed in the dead air space between two lock objects 25 which adjoin a hand of cut, and 25. Since it can install on both sides of the two curl sections 50a and 50a at the point of a pincette, it is assembly top convenience. Of course, the spring operation concerned works effectively like the flat spring 50 of the above-mentioned trapezoidal shape, and since the outer edge of the lock object 25 is certainly stretched to inner skin 28a of casing 28 to rotation of an output shaft 22 and big frictional force is demonstrated, unprepared rotation of an output shaft 22 is not made to never produce. Moreover, the spring 50 of this example is excellent in stability, and can be equal also to prolonged use with the spring nature which stood high.

[0027]

[The 6th example]

The rotation transport unit shown in drawing 11 and drawing 12 is the example which used coil-spring 50' instead of the flat spring of said 4th example. Others are the completely same configurations as the 4th example. Coil-spring 50' is attached as a thing of the strength which the outer edge of the lock object 25 is made to always contact lightly to inner skin 28a of casing 28 between the medial surfaces of two lock objects 25 and 25 which adjoin a hand of cut. The same operation effectiveness as the 4th example is done so according to the spring force of this coil spring 51.

[0028]

[Effectiveness that this design does so]

It can be conveniently used for various applications as a rotation driving means of materials handling machines, such as a rotation driving means, a hoist, a chain block, etc. which demonstrate the engine performance and dependability which were excellent even if the pivotable rotation transport unit used the output shaft concerning this design with the input shaft for a long period of time, since smooth rotation and positive rotation inhibition were performed, for example, open and close a skylight and a side window.

[Translation done.]

* NOTICES *

TECHNICAL FIELD

[Industrial Application]
the means which carries out the rotation drive of the sheet roller of the covering sheet switchgear which this design involves the covering sheet of a vinyl house in a sheet roller, and is opened and closed — carrying out — or said sheet roller — the same — an output shaft — a load etc. — forward — reverse — the output shaft widely used for an application which is troubled if it rotates in any direction is related with a pivotable rotation transport unit with an input shaft.
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PRIOR ART

[Description of the Prior Art]
Conventionally, a pivotable rotation transport unit is indicated by previous JP,1-266359,A only with an input shaft in the output shaft used for the sheet switchgear of a vinyl house etc., and it is well-known. As this rotation transport unit was shown in drawing 13 and drawing 14 , the output shaft 2 and the input shaft 1 were considered as the arrangement each center line of whose corresponds, and provide the body of revolution 3-ed in the axis end section of an output shaft 2. Lock object push wall 4b is formed in the direction of a radius line of the **** body of revolution 3, lock ****** 4a which has a moderate wedge include angle in a tangential direction is formed in the peripheral face section of the body of revolution 3-ed, and at least two lock object acceptance sections 4 by both are formed in it. The heights acceptance section 10 which dedicates the after-mentioned heights 6 for rotation transfer so that two lock ****** 4a in this lock object acceptance section 4 may be made to continue is formed in the circumferencial direction. The deepest part of lock ****** 4a and the roller 5 of approximately the same diameter are installed in said lock object acceptance section 4 as a lock object. The rotation disk 9 is formed in the axis end section of an input shaft 1. The heights 6 for rotation transfer located in the heights acceptance section 10 of said body of revolution 3-ed protrude on this rotation disk 9, and it considers as the relation which contacts the roller 5 located in the lock object acceptance section 4 of those both sides. Said body of revolution 3-ed and rotation disk 9 are in the outer diameter of the body of revolution 3-ed, abbreviation, etc. by carrying out, are compared within cylinder object 8' (casing) of a bore, make the heights 6 for rotation transfer advance to the heights acceptance section 10 of the body of revolution 3-ed, and are assembled. Rotation of said cylinder object 8' is stopped.
[0003]
this rotation transport unit -- an output shaft 2 -- forward -- reverse -- if it is going to rotate in the direction of either, the roller 5 as a lock object will eat away like a wedge between lock ****** 4a of the lock object acceptance section 4 and the inner skin of cylinder object 8' which have a wedge include angle in a tangential direction, will be controlled by frictional force, and will serve as rotation impossible. however, the input shaft 1 -- forward -- reverse -- if it rotates in the direction of either, lock object push wall 4b by the side of the hand-of-cut front of the heights 6 for rotation transfer of an input shaft 1 pushes a roller 5, and locates a roller 5 in the looseness field in the lock object acceptance section 4. Moreover, the roller 5 by the side of method Kogo of rotation of the heights 6 for rotation transfer is pushed to lock object push wall 4b of the body of revolution 3-ed, and is too located in the looseness field in the lock object acceptance section 4. Therefore, an input shaft 1 rotates freely due to output shafts 2 and 1:1.
[0004]

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EFFECT OF THE INVENTION

[Effectiveness that this design does so]
It can be conveniently used for various applications as a rotation driving means of materials handling machines, such as a rotation driving means, a hoist, a chain block, etc. which demonstrate the engine performance and dependability which were excellent even if the pivotable rotation transport unit used the output shaft concerning this design with the input shaft for a long period of time, since smooth rotation and positive rotation inhibition were performed, for example, open and close a skylight and a side window.

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TECHNICAL PROBLEM

[The technical problem which this design tends to solve]
Since rotation of an output shaft 2 is the configuration that rotation is controlled in the actuation into which a roller 5 eats like a wedge to between lock ****** 4a of the lock object acceptance section 4, and the inner skin of cylinder object 8' in the case of above-mentioned drawing 13 and the rotation transport unit of drawing 14 , the inner skin of a roller 5 and the inner skin of cylinder object 8' get damaged shakily, and stop operating smoothly by long repetition use. Moreover, if the body of revolution 3-ed of an output shaft 2 and the rotation disk 9 of an input shaft 1 are especially fabricated as an aluminum die-casting article or a cast in order to raise the productivity of this rotation transport unit and to lower manufacture cost, the draft will surely occur. On the other hand, since the roller 5 as a lock object is begun and cylinder object 8' is respectively considered as the configuration comparatively long in the direction of an axis at the heights 6 list for rotation transfer of lock object push wall 4b, lock ****** 4a, or an input shaft in the body of revolution 3-ed of an output shaft 2 The aforementioned draft serves as the phenomenon in which push wall 6a of the heights 6 for rotation transfer in the inclination and the rotation disk 9 of the direction of an axis of lock object push wall 4b inclines in the direction of an axis in the body of revolution 3-ed of an output shaft 2. Consequently, when an input shaft 1 rotates towards one of right reverse (n or the direction of m of an arrow head shown in drawing 14), it inclines in the direction of an axis to a roller 5, and it will be in a condition per piece, and the heights 6 for rotation transfer do not push this roller 5 on the axis and parallel, but incline it to them a little. For this reason, rotation of an output shaft 2 is carried out grumblingly too, and it has the problem that it does not rotate smoothly and let it be the technical problem which should be solved.
[0005]
Therefore, even if it uses the purpose of this design smoothly [of rotation], and for a long period of time, it is to offer the rotation transport unit by which the dependability on the engine performance is held.
[0006]

[Translation done.]

* NOTICES *

MEANS

[Means for Solving the Problem]
As a means for [of the above-mentioned conventional technique] carrying out The means for solving a technical problem solution, the rotation transport unit concerning this design I An output shaft 22 and an input shaft 21 are considered as the arrangement each center line of whose corresponds. Have formed the body of revolution 23-ed in the toe of an output shaft 22, and at least two lock object acceptance sections 24 which become this body of revolution 23-ed from lock object push wall 23a and lock ******23b which were formed in the direction of a radius line of the **** body of revolution 23 are formed. It is installing in a condition with the lock object 25 loose to radial between lock ****** 23b and the inner skin of the after-mentioned casing 28 which makes the shape of a rod to radial at said lock object acceptance section 24. The rotation disk 29 is formed in the toe of an input shaft 21, and the heights 26 for rotation transfer which contact the point of said lock object 25 protrude on the periphery part of this rotation disk 29. Said body of revolution 23-ed and rotation disk 29, and the lock object 25 are having been assembled within the casing 28 of a cylindrical shape and having stopped rotation of this casing 28. RO Said lock object 25 It forms somewhat longer than the die length on the radius line from lock ******23b of said lock object acceptance section 24 to the inner skin of said casing 28 Ha Said lock object push wall 23a It forms somewhat more sharply than radius line P-Q passing through the core of the body of revolution 23-ed, NI It is characterized by preparing feed plate 30 grade as a delivery means which tells the turning effort from the lock object 25 to body of revolution-ed between two lock objects 25 and 25 contained by said two lock object acceptance sections 24 and 24, respectively (drawing 1 , 2).
[0007]
Moreover, this design is characterized also by forming the spring 50 which has the resiliency which can hold the condition that each outer edge of two lock objects 25 and 25 contained as a means for preventing unprepared rotation of an output shaft certainly by the two lock object acceptance sections 24 and 24 which adjoin a hand of cut contacted inner skin 28a of casing 28 between said two lock objects 25 and 25 (drawing 7 , 8). This spring 50 is characterized also by forming in the curve configuration which has curl section 50a in those both ends, and is roundish as a whole (drawing 10).
[0008]
In addition, this design forms 23d of notches in the outer-diameter side of the body of revolution 23-ed as a premise which adopts the aforementioned spring 50, and protrudes on the rotation disk 29 projection 29a which fits in in the 23d of the notches concerned, and it is characterized also by being the configuration of transmitting turning effort to the body of revolution 23-ed by rotation of an input shaft 21 in contact with the edge said whose projection 29a is 23d of said notches.
[0009]
Furthermore, said lock object 25 is characterized also by forming by metaled phosphor bronze or brass.

[Translation done.]

OPERATION

[Function]
an output shaft 22 — forward — reverse — if it is going to rotate in the direction of either, lock object push wall 23a by the side of before [in the body of revolution 23-ed] a hand of cut the lock object 25 which makes the shape of a rod to radial [which is located in the lock object acceptance section 24 of the front] Push and the lock object 25 make radial stretch the long lock object 25, with a contact with the inner skin of casing 28 fixed, produce the force pushed on the method of outside, and generate and control frictional force so that one end within radial of the tilt angle of said lock object push wall 23a, therefore the lock object 25 may be preceded. Therefore, since rotation of casing 28 is stopped, rotation of the body of revolution 3-ed and an output shaft 2 serves as impossible.
[0011]
Moreover, since the condition that, as for the two lock objects 25 and 25 which adjoin a hand of cut, the outer edge contacted always lightly to casing inner skin 28a with the spring 50 is held, if turning effort works to an output shaft 22, the lock object 25 will be stretched [as opposed to / immediately / inner skin of casing 28 28a], big frictional force is demonstrated, the skid on inner skin 28a is prevented completely, and unprepared rotation of an output shaft 22 can be prevented certainly.
[0012]
on the contrary, the input shaft 21 — forward — reverse — when rotating in the direction of either, it is made to incline so that the radial outside edge of the lock object 25 with which the heights 26 for rotation transfer of the rotation disk 29 carry out advance rotation, and are located in the lock object acceptance section 24 of the front may be pushed and it may fall positively Therefore, the lock object 25 goes to the front with the heights 26 for rotation transfer, without being stubborn between inner skin 28a of casing 28. The lock object 25 located from the heights 26 for rotation transfer in the lock object acceptance section 24 by the side of back at this time advances by being followed on the feed plate 30 which inclines so that it may become the form left by rotation of the body of revolution 23-ed and may fall backward, and is behind for a while, and rotation of an input shaft 21 and the heights 6 for rotation transfer is transmitted to the body of revolution 23-ed and an output shaft 2.
[0013]
Even if the spring 50 is installed between two lock objects 25 and 25 which adjoin a hand of cut There is no trouble in the heights 26 for rotation transfer pushing and moving the radial outside edge of the front lock object 25. Projection 29a prepared in the rotation disk 29 contacts to the edge of 23d of notches formed in the body of revolution 23-ed as well as the frictional force of the outer edge of the lock object 25 stretched between casing inner skin 28a being canceled easily. Turning effort of an input shaft 21 can be smoothly rotated by being certainly transmitted to an output shaft 22.
[0014]

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EXAMPLE

[Example]
Next, the example of illustrated this design is explained.
In the rotation transport unit shown in drawing 1 and drawing 2 , 21 in a sign Fig. is an input shaft, and 22 is an output shaft. Opposite arrangement of an input shaft 21 and the output shaft 22 is carried out at a single string so that each center line may be in agreement (drawing 2).
[0015]
the width of face of the lock object 25 of a postscript [section / of an output shaft 22 / axis end / shape / of a basic form], and abbreviation — the body of revolution 23-ed which formed the lock object acceptance section 24 as a radial notch configuration is formed in one by the shape of same disk type of thickness. The three lock object acceptance sections 24 (however, the number and arrangement should just be not this limitation but one or more pieces.) are formed in the location which divided 120 degrees of peripheries of the body of revolution 23-ed at a time into three equally. The lock object acceptance section 24 is formed as a notch which somewhat keen straight-line-like lock object push wall 23a which inclines, comes out and separates from said center of rotation P more specifically cut deeply deeply enough to radial at drawing 1 to radius line P-Q lengthened from the center of rotation P of an output shaft 22. Heights 23c of the shape of a small semicircle which restrains the inner end position of the lock object 25 is prepared in the center of pars-basilaris-ossis-occipitalis abbreviation of the dead air space of the shape of a sector formed with two lock object push walls 23a and 23a which get mixed up in a hand of cut, and lock ****** 23b is formed in it between lock object push wall 23a of the both sides of this heights 23c.
The feed plate 30 as a means to transmit turning effort through the lock object 25 in the abbreviation center section of the lock object acceptance sections 24 and 24 of two phase next door **** is formed in the hand of cut. The feed plate 30 is formed between the lock objects 25 of both sides in the magnitude and the configuration which have a clearance between some in a hand of cut. It is also possible for the feed plate 30 to be considered as the configuration of another object in an output shaft 22 and the body of revolution 23-ed in consideration of the facilities of an assembly in the case of the example of drawing 1 and drawing 2 , but to form in not this limitation but the body of revolution 23-ed and one.
[0016]
One lock object 25 of the shape of a rod formed in said lock object acceptance section 24 with ingredients, such as brass which is a comparatively soft metal, or phosphor bronze, is installed at a time by arrangement with the play which can be tilted to a hand of cut (refer to drawing 1). The point of this lock object 25 is bent by the character of ** in order to secure the allowances of radius lay length for resiliency. The inner edge of the lock object 25 is contacted by lock ****** 23b, and the outer edge is flexibly contacted by inner skin 28a of the casing 28 of a cylindrical shape. In short, the lock object 25 is somewhat formed for a long time rather than the die length on the radius line from lock ******23b to inner skin 28a of casing 28.
[0017]
On the other hand, the bore of inner skin 28a of the casing 28 of said cylindrical shape and the rotation disk 29 which makes disc-like [of the same outer diameter] mostly are formed in the toe of an input shaft 21 in one. It is circumscribed to the outer-diameter side of said body of revolution 23-ed free [rotation], and the heights 26 for rotation transfer of the shape of a rib projected in the direction of an axis so that the outside edge of the lock objects 25 and 25 moreover located before and behind a hand of cut might be contacted protrude on the peripheral face section of this rotation disk 29. Opposite arrangement of this input shaft 21 and output shaft 22 is carried out at a single string so that the same center line may be shared, the rotation disk 29 and the body of revolution 23-ed are compared within the casing 28 of a cylindrical shape, and the heights 26 for rotation transfer and the body of revolution 3-ed of the rotation disk 29 are assembled. The direction die length of an axis of these heights 26 for rotation transfer is formed in the width of face and abbreviation identitas of the lock object 25 like the width of the above-mentioned lock object acceptance section 24. Side-face opening of casing 28 is sealed by the side cover 31. Let casing 28 and the boss sections 28b and 31a of a side cover 31 be the bearing of an output shaft 22 and an input shaft 21.
[0018]
Therefore, it is stopped so that it may not rotate with the fixed means with which casing 28 omitted illustration, and if it rotates in the direction of a clockwise rotation of drawing 1 , the heights 26 for rotation transfer of the rotation disk 29 move forward, in contact with the outside edge of the lock object 25 located in the front side, the outer edge of this lock object 25 will be pushed, and an input shaft 21 will be moved. At this time, since the lock object 25 is restrained by lock ****** 23b in the toe, it will be in the condition of inclining so that an outside edge may fall on a front side. Therefore, this lock object 25 does not serve as a rotational failure.
Moreover, the lock object 25 by the side of method Kogo of rotation inclines to the condition of falling on the method Kogo sense of rotation with rotation of the body of revolution 23-ed, as a result its lock ****** 23b by using a contact with inner skin 28a of casing 28 as the supporting point, and a rotational failure does not become too. The above actuation is completely similarly realized, when an input shaft 21 rotates in the direction of a counterclockwise rotation. Therefore, rotation of an input shaft 21 and the rotation disk 29 is performed freely, the heights 6 for rotation transfer push the lock object 25, push and the lock object 25 push a feed plate 30 the back, and the rotation tells rotation of the same rate in the same direction to the body of revolution 23-ed and an output shaft 22. Also when an input shaft 21 is rotated in the direction of a counterclockwise rotation of drawing 1 , rotation is told by the completely same principle of operation to an output shaft 22.
[0019]
When an output shaft 22 (therefore, body of revolution 23-ed) tends to rotate in an operation of a load or external force, on the

other hand, lock object push wall 23a of the body of revolution 23-ed It is going to advance the toe of the lock object 25 located in a before [a hand of cut] side by the effectiveness of the keen include angle. The force of pushing this lock object 25 in the direction of an outside although the outer edge of this lock object 25 contacts to inner skin 28a of casing 28 and is being fixed to it therefore is produced. It is stubborn to inner skin 28a of casing 28 like the stock of skiing completely, frictional force is generated in it, and rotation of the body of revolution 23-ed is controlled to it, and it is made, as for the lock object 25, to become rotation impossible. this actuation — an output shaft 22, as a result its body of revolution 23-ed — forward — reverse — when carrying out rotation [which], it completely realizes similarly.

[0020]

In short, the output shaft 22 is absolutely impossible for rotating with external force, a load, etc. in forward reverse both directions, and can make forward reverse both directions rotate this output shaft 22 freely only with an input shaft 21 above. Therefore, this rotation transport unit can be used suitable for an application which is troubled if an output shaft 22 rotates freely with a load etc., or an application [need / the rotation location of an output shaft 22 / certain / to be positioned].

[0021]

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view which cut the rotation transport unit by the B-B line of drawing 2 .
[Drawing 2] It is the sectional view which cut the rotation transport unit by the A-A line of drawing 1 .
[Drawing 3] It is the sectional view which cut the rotation transport unit of the 2nd example along with the B-B line of drawing 4 .

[Drawing 4] It is the sectional view which cut the rotation transport unit same as the above along with the A-A line of drawing 3 .

[Drawing 5] It is the sectional view having cut and shown the 3rd example by the B-B line of drawing 6 .
[Drawing 6] It is the sectional view which cut the rotation transport unit same as the above by the A-A line of drawing 5 .
[Drawing 7] It is the sectional view which cut the rotation transport unit of the 4th example along with the B-B line of drawing 8 .

[Drawing 8] It is the sectional view which cut the rotation transport unit same as the above along with the A-A line of drawing 7 .

[Drawing 9] It is the sectional view having shown the example from which a flat spring differs.
[Drawing 10] It is the sectional view having shown the rotation transport unit of the 5th example.
[Drawing 11] It is the sectional view having cut and shown the rotation transport unit of the 6th example by the B-B line of drawing 12 .
[Drawing 12] It is the sectional view which cut the rotation transport unit same as the above by the A-A line of drawing 11 .
[Drawing 13] It is the perspective view having decomposed and shown the conventional example.
[Drawing 14] It is the sectional view of the conventional example.
[Description of Notations]
21 Input Shaft
22 Output Shaft
24 Lock Object Acceptance Section
23a Lock object push wall
23b Lock ******
25 Lock Object
26 Heights for Rotation Transfer
29 Rotation Disk
28 Casing
28a Inner skin
50 Spring
50a Curl section
23d Notch
29a Projection

[Translation done.]

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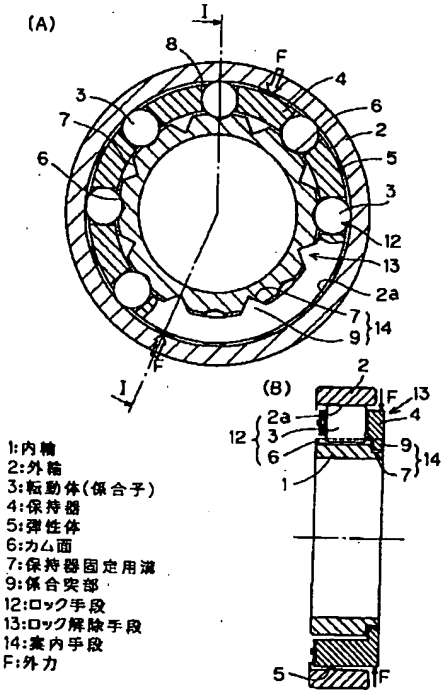
(54)【発明の名称】　２方向同時空転・ロック切替えクラッチ

(57)【要約】
【課題】　正転・逆転方向のいずれの方向にもロック状態を保ち、外部からの操作によって、正転・逆転方向のいずれの方向も同時に回転可能になるという新たな機能を持ったクラッチを提供する。
【解決手段】　内輪１の外径面にＶ溝状のカム面６を設け、外輪２の内径面を円周軌道面２ａとする。これら両面６，２ａに摩擦接触して内外輪１，２間の相対回転をロックする転動体３を介在させる。カム面６は、その中央に転動体３があるときは、外輪－転動体－カム面の間に半径方向・周方向ともに隙間が生じるものとする。転動体３は保持器４のポケットに保持する。保持器４と内輪１とに互いに緩やかに噛み合う係合突部９と保持器固定溝７とを設ける。保持器４に外力Ｆを加えて内輪１に押し付けることで、前記突部９と溝７とが密に噛み合い、転動体３をカム面６の中央に位置するように保持器４が内輪１に固定されるようにする。



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【特許請求の範囲】

【請求項１】　互いに正逆に回転可能な第１の回転部材および第２の回転部材と、常時は前記両回転部材間の正逆両方向の回転をロックするロック手段と、所定の外力が加わることで正逆両方向に回転可能状態に前記ロック手段のロックを解除するロック解除手段とを備えた２方向同時空転・ロック切替えクラッチ。

【請求項２】　互いに正逆に回転可能な第１の回転部材および第２の回転部材を設け、これら第１および第２の回転部材のうちのいずれか一方の回転部材に、回転中心回りの円周軌道面を設け、他方の回転部材に前記円周軌道面と対面するカム面を設け、前記円周軌道面とカム面との間に、これら両面に摩擦接触して前記回転部材の正逆両方向の回転をロックする係合子を介在させ、前記カム面は前記係合子をこのカム面の中立位置に保つことで前記摩擦接触が解除されるものとし、前記係合子を回転部材の回転方向に位置規制状態に保持する保持器を設け、この保持器を、所定の外力が加わることで、前記係合子の位置が前記カム面の前記中立位置となるように前記回転部材に対して拘束状態とする案内手段を設けた２方向同時空転・ロック切替えクラッチ。

【請求項３】　前記第１および第２の回転部材は互いに内外に位置する部材であり、前記円周軌道面とカム面とはこれら回転部材の径方向に対向する面であり、前記カム面は回転部材の円周方向の複数箇所に設け、前記係合子は前記各カム面毎に設けた転動体からなり、前記カム面は、回転部材円周方向の中央部が深くかつ両側に次第に浅くなるように形成されて、その中央部が前記中立位置となり、この中立位置で、前記転動体の径に対して前記円周軌道面とカム面間の間隔に若干の径方向隙間が生じるものとした請求項２記載の２方向同時空転・ロック切替えクラッチ。

【請求項４】　前記案内手段が、前記カム溝の形成側の回転部材および前記保持器のいずれか一方に設けられた保持器固定溝と他方に設けられた係合突部とでなり、これら保持器固定溝と係合突部とは、前記外力の非付与状態で互いに緩み状態に噛み合い、かつ前記外力の付与状態で密に噛み合うものとし、前記保持器と前記円周軌道面側の回転部材との間に所定の摩擦力を与える弾性体を設けた請求項３記載の２方向同時空転・ロック切替えクラッチ。

【請求項５】　前記保持器固定溝および係合突部が、互いに径方向に噛み合うものであり、前記保持器は前記外力で弾性変形可能な材質とし、前記回転部材の回転中心と同芯上で回転可能な操作部材を設け、この操作部材と前記保持器とに、操作部材の回転に伴って前記外力となる径方向力を前記保持器に作用させる操作用カム面を各々設けた請求項４記載の２方向同時空転・ロック切替えクラッチ。

【請求項６】　前記保持器固定溝および係合突部が、互

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いに軸方向に噛み合うものであり、前記回転部材の回転中心と同芯上で回転可能な操作部材を前記保持器の側面と対面して設け、この操作部材と前記保持器とに、操作部材の回転に伴って前記外力となる軸方向力を前記保持器に作用させる操作用カム面を各々設け、前記操作部材を保持器から離れる方向に付勢する復帰用弾性体を設けた請求項４記載の２方向同時空転・ロック切替えクラッチ。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】この発明は、各種の機器の機械構造部分、例えば、自然状態では正転・逆転方向共に自由に回転できないが、必要に応じて正転・逆転方向共に同時に自由に回転が可能な機能を必要とする機械構造部分に使用できる２方向同時空転・ロック切替えクラッチに関する。

【０００２】

【従来の技術】例えば、手押し車の車輪やドアの車輪は、何らかの方法で止めない限り、傾斜面においては水平方向の分力や慣性力のために動くことが可能である。このために、用途によっては、外部から車輪にブレーキ機構を付加して危険の防止を図っているのが現状である。図１８に、従来から知られているワンウェイクラッチの代表的な構造例を示す。このクラッチは、軸８１、外輪８２、ころ８３、保持器８４、およびばね８５で構成されている。外輪８２には、傾斜カム面８６が設けられており、ばね８５は、ころ８３をカム面の狭い側に押し付けて、軸固定時には外輪８２の時計方向への回転に対しては即座にロックする構造となっている。また、図１９にツーウェイクラッチの代表的な構造例を示す。このクラッチの特徴は、外輪９２に、互いに対向する２つの傾斜カム面９７を持つことと、保持器９４を必要に応じて周方向に移動させるための手段（この例ではレバー９８）を持つことである。これによって、時計方向あるいは反時計方向に外輪９２のロック方向を切り替える機能を持つことができる。

【０００３】

【発明が解決しようとする課題】ワンウェイクラッチは、名前のとおり一方向への回転のみをロックするだけであり、ツーウェイクラッチはレバー等の操作によって、時計方向あるいは反時計方向だけにロックする機能があるが、両方向回転共にロックする機能は持っていない。したがって、安全性を要求する手押し車の車輪やドア用の車輪等が要求するクラッチとしての機能はなかった。

【０００４】この発明の目的は、正転・逆転方向のいずれの方向にもロック状態を保ち、外部からの操作によって、正転・逆転方向のいずれの方向も同時に回転可能になるという新たな機能を持った２方向同時空転・ロック切替えクラッチを提供することである。

【0005】
【課題を解決するための手段】この発明の2方向同時空転・ロック切替えクラッチは、互いに正逆に回転可能な第1の回転部材および第2の回転部材と、常時は前記両回転部材間の正逆両方向の回転をロックするロック手段と、所定の外力が加わることで正逆両方向に回転可能状態に前記ロック手段のロックを解除するロック解除手段とを備えたものである。なお、この明細書で言う「回転部材」は相対的な回転が可能な部材のことであり、片方の回転部材が常に角度固定状態で用いられるものであっても良い。この構成によると、第1の回転部材と第2の回転部材とは、常時はロック手段で互いの相対回転が不能なように回転がロックされており、すなわち回転が阻止されており、ロック解除手段に所定の外力を加えることで、前記ロック手段のロックが解除され、第1の回転部材と第2の回転部材間の正逆両方向の回転が可能となる。

【0006】上記構成において、前記ロック手段およびロック解除手段は、例えば次の構成とできる。ロック手段は、第1および第2の回転部材のうちの一方の回転部材に、回転中心回りに設けた円周軌道面と、他方の回転部材に設けられて前記円周軌道面と対向するカム面と、これら円周軌道面とカム面との間に介在され、これら両面に摩擦接触して前記回転部材の正逆両方向の回転をロックする係合子とで構成される。前記カム面は前記係合子をこのカム面の中立位置に保つことで前記摩擦接触が解除されるものとする。ロック解除手段は、次の保持器と案内手段とで構成される。保持器は、前記係合子を回転部材の回転方向に位置規制状態に保持するものとする。前記案内手段は、所定の外力が加わることで、前記係合子の位置が前記カム面の前記中立位置となるように、前記保持器を前記回転部材に対して拘束状態にするものとする。この構成の場合、常時は、一方の回転部材の円周軌道面と、他方の回転部材のカム面とに係合子が摩擦接触し、これら回転部材間の正逆両方向の回転をロックする。このとき、係合子はカム面の中立位置からいずれかの方向に偏った位置にある。保持器に所定の外力を与えると、保持器は案内手段で案内されて若干移動し、その保持している係合子を前記カム面の中立位置に位置させる。前記カム面は、係合子が中立位置に保たれることで前記摩擦接触が解除され、これにより両回転部材の相対回転が両方向に可能となる。

【0007】この構成の2方向同時空転・ロック切替えクラッチにおいて、次の構成としてもよい。前記第1および第2の回転部材は互いに内外に位置する部材とし、前記円周軌道面とカム面とは、これら回転部材の径方向に対向する面とする。前記カム面は回転部材の円周方向の複数箇所に設ける。前記係合子は前記各カム面毎に設けた転動体とする。また、前記カム面は、回転部材円周方向の中央部が深くかつ両側に次第に浅くなるように形成されて、その中央部が前記中立位置となり、この中立位置で、前記転動体の径に対して前記円周軌道面とカム面間の間隔に若干の径方向隙間が生じるものとする。この構成の場合、常時は、第1と第2の回転部材にいずれかの方向の相対回転が若干生じると、この回転に伴って係合子である転動体がカム面を中立位置から偏った浅い位置に移動し、カム面と円周軌道面とに摩擦接触して回転部材のそれ以上の回転を阻止する。回転部材が前記と逆方向に回転した場合は、転動体がカム面の中立位置から前記と逆方向に偏った位置に移動し、それ以上の回転体の回転を阻止する。保持器に所定の外力を与えると、保持器は案内手段で案内されて若干移動し、その保持している転動体をカム面の最も深い中立位置に位置させる。そのため、両方向の回転のロックが同時に解除される。

【0008】また、この構成において、各部を次の構成としてもよい。前記案内手段は、前記カム溝の形成側の回転部材および前記保持器のいずれか一方に設けられた保持器固定溝と他方に設けられた係合突部とでなり、これら保持器固定溝と係合突部とは、前記外力の非付与状態で互いに緩み状態に噛み合い、かつ前記外力の付与状態で密に噛み合うものとする。前記保持器と前記円周軌道面側の回転部材との間に所定の摩擦力を与える弾性体を設ける。この構成の場合、常時は、保持器固定溝と係合突部とが緩み状態に噛み合っており、この緩み範囲で保持器とカム面側の回転部材との相対回転が可能となる。そのため、保持器で転動体をカム面の中立位置に保持する機能は生じず、前記のように転動体の摩擦接触で両回転部材の両方向の回転がロックされる。保持器に所定の外力を与えると、保持器固定溝と係合突部とが密に噛み合い、保持器はカム面側の回転部材に拘束されて、その保持している転動体をカム面の中立位置に保持する。そのため、回転部材の両方向の回転が可能となる。弾性体は、ロック解除後に外力を除いて再度ロック状態とするときに、転動体がカム面の浅い位置に移動するように、円周軌道面側の回転部材の回転による保持器の連れ回りを生じさせるものであり、これにより確実にロックを生じさせる。

【0009】さらに、この構成において、前記保持器固定溝および係合突部を、互いに径方向に噛み合うものとし、前記保持器は前記外力で弾性変形可能な材質とする。前記回転部材の回転中心と同芯上で回転可能な操作部材を設け、この操作部材と前記保持器とに、操作部材の回転に伴って前記外力となる径方向力を前記保持器に作用させる操作用カム面を設けても良い。この構成の場合、回転ロック状態から、操作部材を回転させると、操作用カム面の作用で、保持器に径方向力が与えられ、この径方向力で保持器が弾性変形して、保持器固定溝と係合突部とが密に噛み合う。これより、前記のように転動体がカム面の中立位置に保持され、回転部材の両方向の

回転が可能となる。

【００１０】この保持器固定溝および係合突部は、互いに軸方向に噛み合うものとしても良い。この場合に、回転部材の回転中心と同芯上で回転可能な操作部材を前記保持器の側面と対面して設け、この操作部材と前記保持器とに、操作部材の回転に伴って前記外力となる軸方向力を前記保持器に作用させる操作用カム面を設ける。また、前記操作部材を保持器から離れる方向に付勢する復帰用弾性体を設ける。この構成の場合、回転ロック状態から、操作部材を回転させると、操作用カム面の作用で、保持器に軸方向力が与えられ、保持器固定溝と係合突部とが密に噛み合う。これより、前記のように転動体がカム面の中立位置に保持され、回転部材の両方向の回転が可能となる。

【００１１】

【発明の実施の形態】この発明の第１の実施形態を図１ないし図７と共に説明する。この２方向同時空転・ロック切替えクラッチは、第１の回転部材である内輪１と、第２の回転部材である外輪２と、ころからなる係合子である転動体３と、保持器４と、板ばね等の弾性体５とで構成され、後述のロック手段１２およびロック解除手段１３が設けられている。この２方向同時空転・ロック切替えクラッチは、いわば２ウェイクラッチの基本構造を応用したものである。

【００１２】内輪１は、図２に示すように厚肉円筒状に形成されており、その外径面にはクラッチとしてのロック機能を発揮するためのカム面６が円周方向の複数箇所に設けられている。各カム面６は等間隔で設けられている。これらカム面６は、円周方向の中央部が深くかつ両側に次第に浅くなるように形成されたものであり、概ねＶ字状の断面形状とされている。このカム面６は、図３（Ａ）のように直線状であっても、同図（Ｂ）のように凹円弧状などの曲面状であっても良い。カム面６のＶ字状の開き角度αは、例えば１５５°～１７５°に設定されている。カム面６は、内輪１の軸方向の全長に設けられているが、軸方向の一部に設けたものであっても良い。内輪１の片側の幅面の外径側には、保持器固定溝７が円周方向の複数箇所に設けられている。例えば、保持器固定溝７はカム溝６と交互に設けられている。保持器固定溝７は、溝幅の中心部が深くなる断面形状のものであり、この例では概ねＶ字状の断面形状とされている。Ｖ字状の傾斜は、カム溝６に比べて急勾配としてある。なお、内輪１は、この例では円筒状としたが、軸であっても良い。すなわち、軸に直接にカム溝６や保持器固定溝７が加工されていても良い。

【００１３】図１に示すように、外輪２は、その内径面部分をころからなる転動体３が転走可能なように、円筒面状の円周軌道面２ａとしてある。外輪２の円周軌道面２ａと、内輪１のカム溝６と、転動体３とで、内輪１と外輪２との正逆両方向の相対回転を阻止するロック手段１２が構成される。外輪２は、この例では厚肉円筒状の部品としてあるが、外径面は円筒面に限らず、車輪形状や、プーリ形状、あるいはその他の目的に応じた任意形状であっても良い。また、外輪２は、この例では、保持器４の係合突部９（後述する）側の外径面が露出するように、内輪１および保持器４よりも幅狭に形成してある。

【００１４】保持器４は、図４に示すように円筒状に形成され、円周方向の複数箇所に、転動体３を保持するポケット８が内外径に貫通して形成され、かつ内輪１の各保持器固定溝７と噛み合う係合突部９と、ばね固定用ピン１０とが各々周方向複数箇所に設けられている。係合突部９は、保持器４の内径面に設けられ、三角形の山形とされている。ばね固定用ピン１０は、保持器４における係合突部８のある幅面と反対側の幅面に設けられている。保持器４の係合突部９と、内輪１の保持器固定溝７とで、案内手段１４が構成される。また、この案内手段１４と保持器４とで、ロック解除手段１３が構成される。

【００１５】図５は、保持器４に弾性体５を取付けた状態を示す。弾性体５は、リング状の側板５ａと、この側板から放射状に延びるアーム状の複数のばね片５ｂとからなる板ばねで構成される。ばね片５ｂは、側板５ａから斜め外径側に延びて先端部分が軸方向と略平行となるように折り曲げられており、その先端部分が外輪２の内径面に押し付け状態に接触する。弾性体５は、保持器４に設けられたばね固定用ピン１０を側板５ａの孔に挿通し、加締ることで保持器４に固定されている。弾性体５の固定は、加締による他に、溶着やねじ止め、あるいは鋲止め、または接着でも良い。

【００１６】弾性体５は、外輪２の回転に対して保持器４が一定の摩擦力を保持して連れ回る機能が得られれば良いのであるから、ばね部材の他にゴム等の弾性体を用いても良い。例えば、図９に変形例を示すように、保持器４の外径面に設けた円周溝にＯリング等からなるリング状の弾性体５Ａを埋め込むか、あるいはこれとは逆に外輪２の内径面に円周溝を形成してリング状の弾性体を埋め込んでも良い。リング状の弾性体には、Ｏリングの代わりに、波形に屈曲した線ばねまたは板ばね（図示せず）を用いても良い。また、図１０に示すように、保持器４の外径面に局部的に設けた凹部に弾性体５Ｂを埋め込むようにしても良い。さらに、このような弾性体を設ける代わりに、保持器４を多角形にするか、保持器４の外径面に突部を設けるなどして、保持器４の周方向の複数箇所が外輪２の内径面に当たり、保持器４自体の弾性で外輪２に対して連れ回りが生じる程度の一定の摩擦力が得られるようにしても良い。

【００１７】上記構成のクラッチ機能の説明および構成の補助説明をする。図１に示す自然状態での理想状態では、図６（Ａ）のように転動体３は、周方向の位置にお

いては、カム面６の中央（中立位置）にあり、同時に保持器４の係合突部９と内輪１の保持器固定溝７とは位相が一致している。また、転動体３を入れるための保持器４のポケット８は、転動体３に対する周方向隙間が極めて小さい（転動体３の直径の１％以下）か、若しくは負の隙間となるように設計されている。この状態において、図１（Ｂ）に示すように、保持器４を外径部分から径方向に外力Ｆで内輪１に押し付けると、図６（Ｂ）のように保持器４は押された部分が撓んで、保持器４の係合突部９と内輪１の保持器固定溝７との隙間が無くなり、保持器４は内輪１に対して周方向の位相関係が固定される。その結果、全数の転動体３がカム面６の中立位置である中央に強制的に保持される。保持器４を内輪１に対して押し付ける部分は、円周方向に２～４等分した部分が望ましい。

【００１８】この状態においては、内輪１と保持器４は周方向に相対回転することはできない。また、転動体３は、カム面６の中央に位置するときは、外輪２に対して半径方向の僅かな隙間を有するように設定されている（結果的には周方向の隙間も生じる）。したがって、この状態ではクラッチとしての回転ロック機能は無くなる。すなわち、外輪２は正方向（例えば時計方向とする）と逆方向のいずれの方向にも回転が可能となる。

【００１９】保持器４を押し付ける外力Ｆを除くと、図６（Ａ）の状態に戻る。この状態から、内輪１が固定で、外輪２が時計方向に回転すると、保持器４はばね部材５による摩擦力の効果によって、外輪２の回転と同時に時計方向に回転を始める。その結果、保持器４のポケット８に収納されている転動体３も同時に時計方向に回転するので、極めて小さな回転角度ではあるが、転動体３はいずれ、内輪１のカム面６と干渉する。転動体３が内輪１のカム面６と干渉した状態は図７に示すようであり、転動体３がカム面６および外輪２の接触点となす角度βは５～２５°〔１８０°－（１５５°～１７５°）〕となる。この角度は、一般的なクラッチのストラト角として知られている。

【００２０】図７（Ａ）の状態になると、外輪２はそれ以上時計方向に回転することが不可能となる。すなわち、ここでクラッチとしての回転ロック機能が生じることになる。この場合、保持器４の係合突部９は、まだ内輪１の保持器固定溝７に干渉しないような寸法に設定される。外輪２が反時計方向に回転をするときも、各部品は前記と同じような動きをして、回転ロック機能が生じる。すなわち、保持器４に外力Ｆを与えない限り、外輪２は時計方向にも反時計方向にも回転できない。元の両方向回転共に空転状態に戻すときは、保持器４に対して再び外力Ｆを加えて、保持器４を内輪１に押し付ければ良い。転動体３は、カム面６の中央に移動するので、回転ロック機能が再び無くなる。

【００２１】このように、この２方向同時空転・ロック切替えクラッチは、保持器４に外力Ｆを加えることによって、時計・反時計方向のいずれの方向へも同時に空転状態とすることと、同時に回転ロック機能を生じる状態とに切り替えることができる。このため、例えば、このクラッチを、手押し車やドア用の軸受と共に使用した場合、手を放せば車輪やドアはその場所に留まっている様な安全な機構が安価に実現できる。

【００２２】図８は、図１～図７に示した２方向同時空転・ロック切替えクラッチに、外力付与用の操作部材１６を設けた例を示す。操作部材１６は、円周方向の一部にレバー部１６ａを有するリング状の部材であり、内輪１を取付けた軸２０の外径面に回転自在に嵌合させてある。内輪１は、軸２０の小径部と大径部との間の段差面から若干離れてその小径部に嵌合状態に固定してあり、また保持器固定溝７のある幅面を前記段差面２０ａ側に向けて配置してあり、操作部材１６は、内輪１と前記段差面２０ａとの間に介在している。操作部材１６は、保持器４の外周に位置する鍔状のリング部１６ｂを有し、このリング部１６ｂの内径面の周方向複数箇所（図示では４か所）に、操作部材１６の回転に伴って前記外力Ｆとなる径方向力を保持器４に作用させる操作用カム面１７を設けてある。操作用カム面１７は、リング部１６ｂの内径面となる円の一部の弦となる直線に形成してある。また、これら操作用カム面１７に各々接する複数の操作用カム面１８を、保持器４の外径面に円弧状断面の突部によって形成してある。

【００２３】このように操作部材１６を設けた場合、図８（Ａ）に示す回転ロック状態から、操作部材１６を所定角度（図示の例では４５°程度）回すと、操作用カム面１７，１８同志が係合し合い、保持器４を内輪１に押し付ける径方向の外力が操作部材１６から保持器４に与えられる。これにより、保持器４が撓んでクラッチとしての回転ロックの解除状態となる。操作部材１６を元の図８（Ａ）の角度に戻すと、保持器４は弾性で元の形状に復帰し、回転ロック状態に戻る。なお、同図の例は、保持器４に操作用カム面１８を設けたこと、および操作部材１６を設けたことを除いて、図１～図７に示した例と同じ構成である。

【００２４】図１１ないし図１４は、この発明の第２の実施形態を示す。この例は、保持器４に軸方向の外力を与えることで、回転ロック状態とロック解除状態とを切り替えるようにしたものである。この例は、保持器４と内輪１の一部で構成される案内手段１４Ａの構成、および外輪２の幅を変えたことを除いて、図１ないし図７の例と同じ構造である。ただし、保持器４は、弾性変形可能な材質である必要はない。図１２に示すように、内輪１の幅面の一部に保持器４の係合突部９Ａ（図１３）と噛み合う保持器固定溝７Ａを設ける。保持器４は、内径面の一側に鍔部１９を有するものとし、この鍔部１９の内側に係合突部９Ａが設けてある。保持器固定溝７Ａは

Ｖ溝状とし、係合突部９Ａはこの Ｖ溝状の保持器固定溝７Ａに対応した三角形状の山形としてある。これら保持器固定溝７Ａおよび係合突部９Ａにより、案内手段１４Ａが構成される。内輪１のカム溝６の形状は図１の例と同じである。

【００２５】この例では、空転状態と回転ロック状態との切り替えを、軸方向の外力F_Aによって保持器４を内輪１に押し付けることにより行う。保持器４が軸方向に押し付けられると、保持器４の係合突部９Ａと内輪１の保持器固定溝７Ａとが噛み合って保持器４は内輪１に固定され、転動体３も前記の例と同じようにカム面６の中央に保持されるので、時計・反時計方向の両方向に対して空転状態となる。外力F_Aを除くと、第１の実施形態と同様に、時計・反時計方向の両方向に対して回転ロック状態となる。なお、図１１の第２の実施形態では、空転状態と回転ロック状態との切り替えの応答性を良くするためには、図１１（Ｂ）に示すように別の外力Ｐによって、保持器４を積極的に戻す手段を設けることが望ましい。

【００２６】図１５および図１６は、図１１～図１４に示した実施形態の２方向同時空転・ロック切替えクラッチに、外力付与用の操作部材１６Ａを設けた例を示す。操作部材１６Ａは、円周方向の一部にレバー部１６ａを有するリング状の部材であり、内輪１を取付けた軸２０の外径面に回転自在に嵌合させてある。内輪１は、軸２０の小径部と大径部との間の段差面２０ａから若干離れてその小径部に嵌合状態に固定してあり、また保持器固定溝７Ａのある幅面を前記段差面側に向けて配置してあり、操作部材１６Ａは、内輪１と前記段差面との間に介在している。操作部材１６Ａは、保持器４の幅面と対向する面の周方向複数箇所（図示では４か所）に、操作部材１６Ａの回転に伴って前記外力F_Aとなる径方向力を保持器４に作用させる操作用カム面１７Ａを設けてある。また、これら操作用カム面１７Ａに各々接する複数の操作用カム面１８Ａを、保持器４の幅面に形成してある。これら操作用カム面１７Ａ，１８Ａは、緩い勾配のＶ字状の山形としてある。隣合う操作用カム面１７Ａ間の部分は、平坦面部１７Ｂとされている。なお、この緩い勾配のＶ字状山形は、操作用カム面１７Ａ，１８Ａのいずれか一方にのみあっただけで良く、他は部分的な凸部でもよい。また、図１６Ｂには保持器４に、前記外力Ｐを得る復帰用弾性体２１を内蔵状態に取付けてある。この復帰用弾性体２１は板ばねからなり、保持器４の内径面に径方向に沿って設けて取付溝２２に嵌め込み状態に取付けてある。

【００２７】このように操作部材１６Ａを設けた場合、図１５（Ａ）に示す回転ロック状態から、操作部材１６Ａを所定角度（図示の例では４５°程度）回すと、操作用カム面１７Ａ，１８Ａ同志が係合し合い、保持器４を内輪１に押し付ける軸方向の外力が操作部材１６Ａから保持器４に与えられる。これにより、保持器４が撓んでクラッチとしての回転ロックの解除状態となる。操作部材１６Ａを元の図１５（Ａ）の角度に戻すと、保持器４は復帰用弾性体２１の復元力で復帰し、回転ロック状態に戻る。なお、同図の例は、保持器４に操作用カム面１８Ａを設けたこと、操作部材１６Ａを設けたこと、および復帰用弾性体２１を設けたことを除いて、図１１～図１４に示した例と同じ構成である。

【００２８】図１７は、この発明の２方向同時空転・ロック切替えクラッチＡを車両用のシート背もたれ傾き角度調整装置として利用した例を示す。シート３０の背もたれ３１は、背もたれ支持部材３２に係合自在に支持されており、この背もたれ２１の傾動中心と中心位置が一致するように、２方向同時空転・ロック切替えクラッチＡが配置される。このクラッチＡは、その内輪１および外輪２のいずれか一方が背もたれ支持部材３２に固定され、他方が背もたれ３１に固定される。なお、背もたれ３１には、起立側に付勢する復帰ばね３３を設けておく。クラッチＡは、前記いずれの実施形態のものであっても良い。

【００２９】なお、前記各実施形態ではカム面６に接触する係合子として転動体３を用いたが、転動体３の代わりに、非円形の断面形状の係合子を用いても良い。また、前記各実施形態では、カム面６を内輪１に、円周軌道面２ａを外輪２に各々設けたが、これとは逆に内輪１に円周軌道面を、外輪２にカム面を設けても良い。さらに、第１の回転部材および第２の回転部材は、前記各実施形態のように内輪１および外輪２とする代わりに、互いに軸方向に対面する部材とし、カム面および円周軌道面を軸方向に対面させても良い。

【００３０】

【発明の効果】この発明の２方向同時空転・ロック切替えクラッチは、正転・逆転方向のいずれの方向にもロック状態を保ち、外部からの操作によって、正転・逆転方向のいずれの方向も同時に回転可能になるという従来に例の無い機能を持ったものとできる。

【図面の簡単な説明】

【図１】（Ａ）はこの発明の第１の実施形態にかかるクラッチの破断正面図、（Ｂ）は同図（Ａ）のＩ－Ｉ線断面図である。

【図２】同クラッチの内輪の斜視図である。

【図３】同内輪のカム面の各種の例を示す拡大断面図である。

【図４】同クラッチの保持器の斜視図である。

【図５】同保持器に弾性体を取付けた状態の斜視図である。

【図６】作用説明図である。

【図７】他の動作状態の作用説明図である。

【図８】（Ａ）は同クラッチに操作部材を追加した例の破断正面図、（Ｂ）はその破断側面図である。

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【図９】（Ａ）は保持器と弾性体との組み合わせの変形例の斜視図、（Ｂ）はその部分断面図である。

【図１０】保持器と弾性体との組み合わせ体の他の変形例の斜視図である。

【図１１】（Ａ）はこの発明の第２の実施形態にかかるクラッチの部分切欠破断正面図、（Ｂ）はそのＸＩ－Ｘ１線断面図である。

【図１２】同クラッチの内輪の斜視図である。

【図１３】同クラッチの保持器の斜視図である。

【図１４】同保持器にばね部材を取付けた状態の斜視図である。

【図１５】（Ａ）は同クラッチに操作部材を追加した例の破断正面図、（Ｂ）はそのXIII-XIII 線に沿う破断側面図である。

【図１６】（Ａ）はその保持器と操作部材の関係を示す斜視図、（Ｂ）は同保持器にばね部材および復帰用弾性体を取付けた状態の斜視図、（Ｃ）はその復帰用弾性体の斜視図である。

【図１７】この発明の２方向同時空転・ロック切替えクラッチを応用したシート背もたれ傾き角度調整装置の側面図である。

【図１８】従来例の断面図である。

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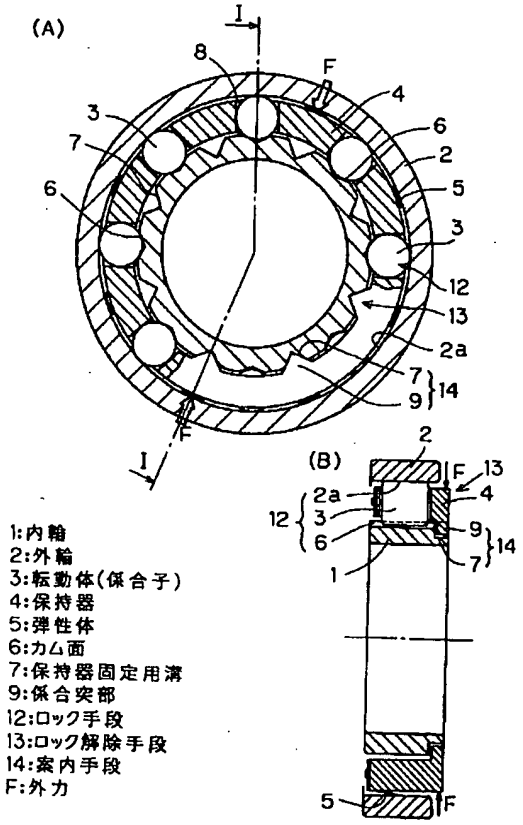
＊【図１９】他の従来例の断面図である。

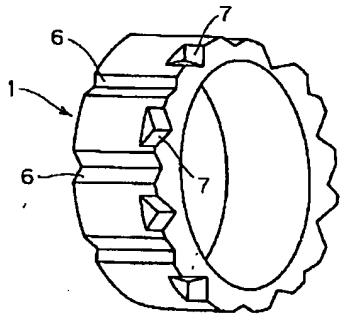
【符号の説明】

１…内輪（第１の回転部材）
２…外輪（第２の回転部材）
３…転動体（係合子）
４…保持器
５…弾性体
６…カム面
７…保持器固定用溝
９…係合突部
１２…ロック手段
１３…ロック解除手段
１４…案内手段
１４Ａ…案内手段
１６…操作部材
１６Ａ…操作部材
１７，１８…操作用カム面
１７Ａ，１８Ａ…操作用カム面
２１…復帰用弾性体
Ｆ…外力
F_A …外力

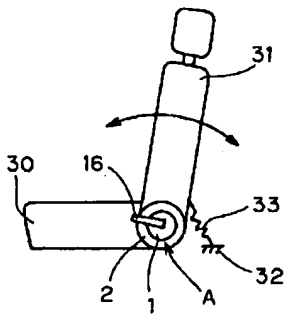
【図１】



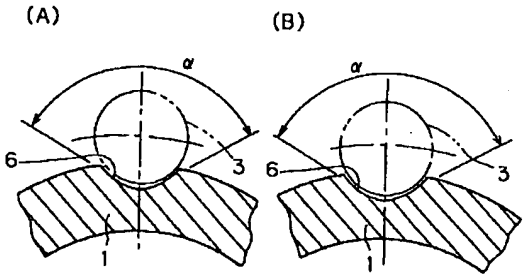
【図２】



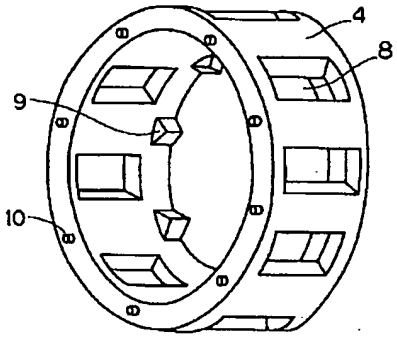
【図１７】



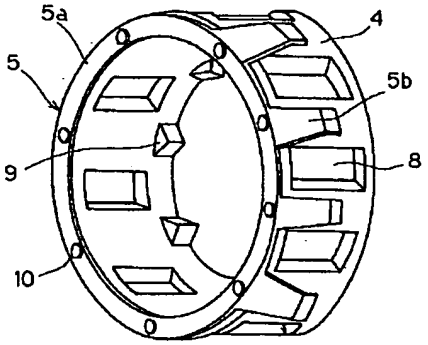
【図３】



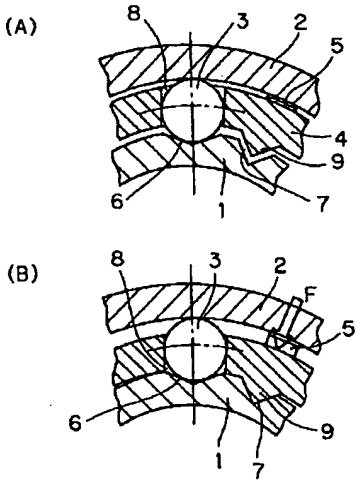
【図４】



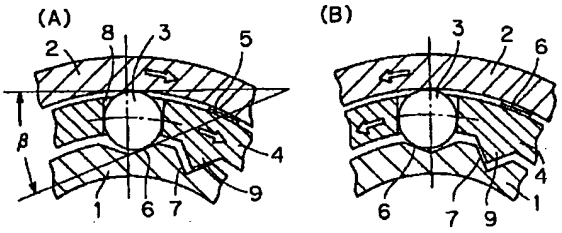
【図５】



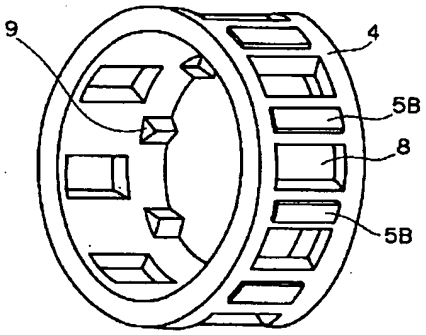
【図６】



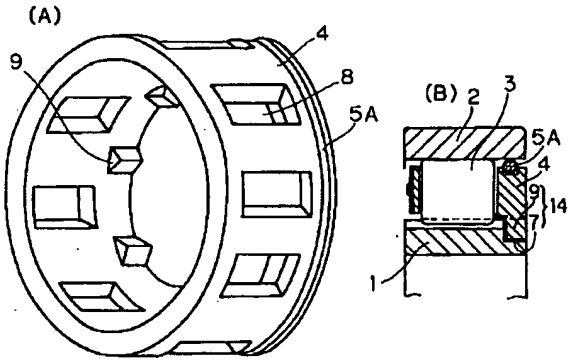
【図７】



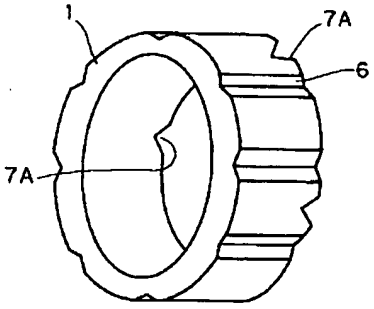
【図１０】



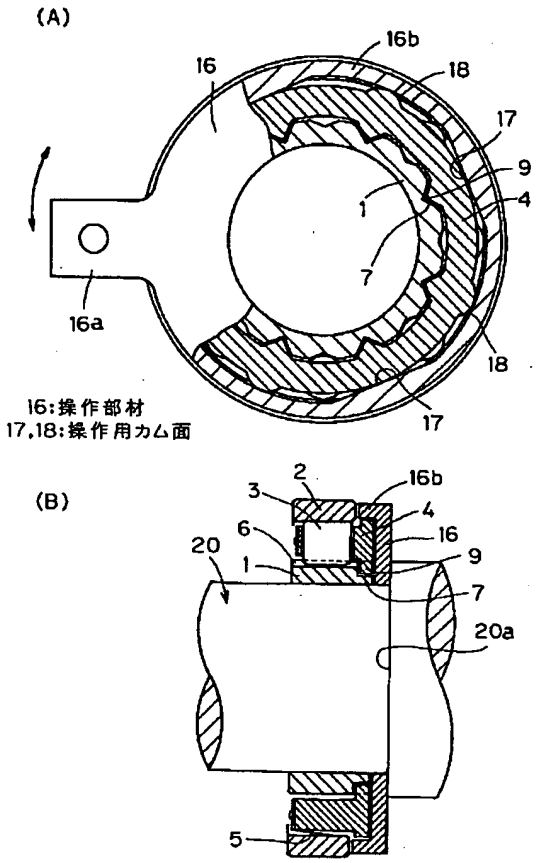
【図９】



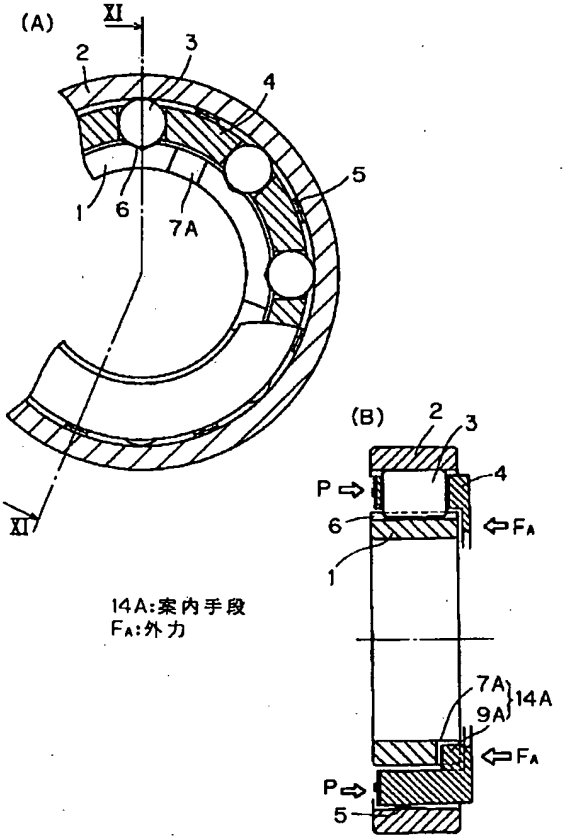
【図１２】



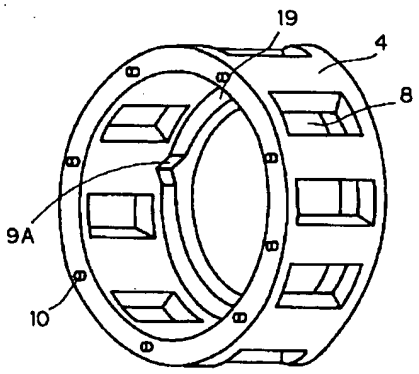
【図８】



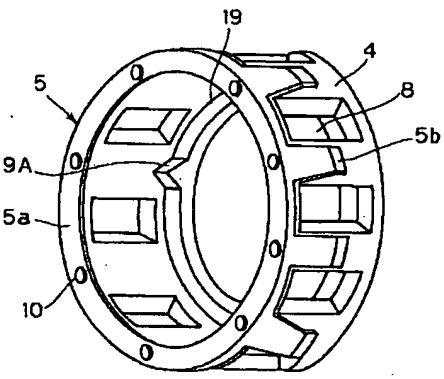
【図１１】



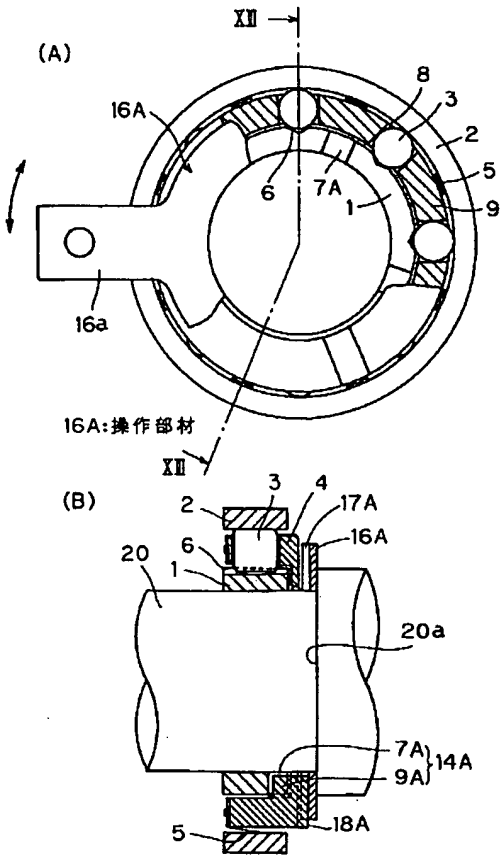
【図１３】



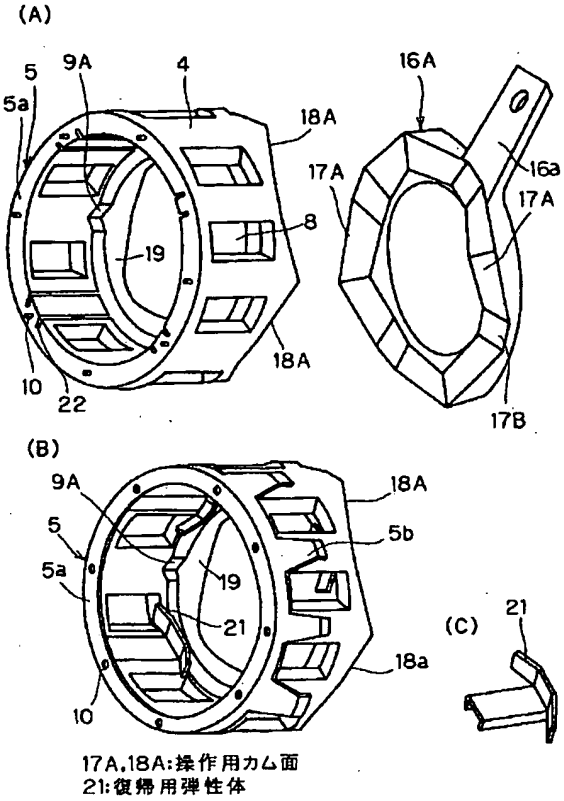
【図１４】



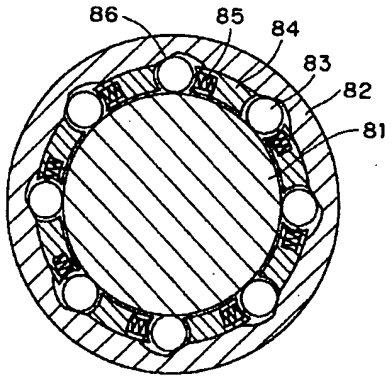
【図１５】



【図１６】



【図１８】



【図１９】